

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY

FOREST INSECT INVESTIGATIONS

REPORT COVERING THE SURVEY OF THE MOUNTAIN PINE BEETLE INFESTATION  
ON THE GALLATIN NATIONAL FOREST

1934

By

A. L. Gibson

Assistant Entomologist

Forest Insect Field Station  
Coeur d'Alene, Idaho  
January 8, 1935.

Refer to file  
Project G-2

Forest Insect Laboratory,  
Coeur d'Alene, Idaho  
Feb. 6, 1935

W. J. B.

Dr. F. C. Craighead

Washington, D. C.

Dear Dr. Craighead:

I am enclosing six copies of a report covering the survey of the mountain pine beetle infestation on the Gallatin National Forest, by Mr. A. L. Gibson. Mr. Gibson prepared this report in addition to the inclusion of his data in the Yellowstone-R<sup>4</sup> control-project report. He is also preparing a report of the Beaverhead survey, and we are planning to have a more detailed report of the Yellowstone, Targhee, and Teton Forests prepared in order to keep this material on file.

I am continuing to forward these reports through your office, though it does seem like a rather marked departure from previous practices. This report contains no recommendations, but is merely a statement of existing conditions. However, I feel that it may be well to route all reports for a time through your office in order that you may better formulate a plan which will be more satisfactory to you. The different copies have been marked with their destinations.

Respectfully yours,

cc to Miller & Keen

James C. Evenden  
Entomologist

Enclosures

## Status of the Mountain Pine Beetle Infestation of the Gallatin National Forest, 1934

Although data from the 1934 survey of the Gallatin National Forest have been presented in the Yellowstone control project report, submitted on December 8, 1934, this report has been prepared for the purpose of giving a more detailed discussion of existing conditions. The 1934 survey was similar to that of previous years except that a less intensive examination was made because of the larger area which was covered. A considerable portion of this area is not a part of the Gallatin Forest, but is included in this report owing to its direct bearing upon the insect infestation on that Forest.

### General Status of the Infestation

Although the infestation on this forest is rather light, it is increasing quite rapidly. In addition, the five new units added in 1934 had a heavier concentration of attack than any of those previously surveyed. In Table I the gain in infestation during the past four years is shown. The table includes only those units on which surveys have been conducted for two years or more.

Table I

### STATUS OF THE MOUNTAIN PINE BEETLE INFESTATION IN LODGEPOLE PINE AND WHITEBARK PINE ON THE GALLATIN NATIONAL FOREST 1931-34

Tree species	Attacked Trees per Acre				Percent Change in Status		
	1931	1932	1933	1934	1931-2	1932-3	1933-4
Lodgepole Pine	:.0212	:.0245	:.0189	:.0521	15.8	-22.9	175.7
Whitebark Pine	:.0234	:.0301	:.0425	:.0555	28.6	41.2	30.6

It will be seen that there is a surprising similarity in the amount of infestation in each timber type except in 1933 when severe cold of the preceding winter greatly reduced the insect brood in lodgepole pine but caused no noticeable mortality in the whitebark pine which was better protected due to its thicker bark and deeper snow around the bole.

#### STATUS OF THE INFESTATION OF EACH UNIT

In the succeeding pages, each unit is discussed separately in order to present the aspect of the outbreak in more detail.

##### South Cottonwood Acreage 71,000

<u>Survey record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	178	71	166	258
New attack per strip acre	.011	--	.026	.019
<u>Attacked trees on unit:</u>				
Lodgepole pine & whitebark pine	799	--	1868	1379

The amount of survey run on this unit is insufficient and the infestation too light to justify separating the data for the two susceptible timber types. The data for the South Cottonwood Unit indicate an extremely light infestation.

##### Swan-Squaw Creek Acreage 57,000

<u>Survey record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	150	306	364	405.3
New attacks per strip acre	.033	.063	.033	.178
<u>Attacked trees on unit:</u>				
Lodgepole pine	1186	3370	1519	1545
Whitebark pine	678	210	180	599
Totals	1864	3580	1899	10,136

The data indicate a considerable increase in the number of attacked trees on this unit in 1934. The area to which the infestation is believed to be chiefly confined supports a dense stand of whitebark pine which was heavily wind damaged a few years ago. It is in these damaged trees that the insects have secured a decided impetus. The exact boundaries of this area are not known but it is believed to extend along most of the ridge dividing the Swan-Square and South Cottonwood Units. At the lower edge of this area of damaged timber lodgepole pine comprises a considerable part of the stand, and many of these trees have been attacked. Control has been suggested for this area in the Yellowstone report. On the remainder of the unit there is no known concentration of attack.

Gallatin Peak  
Acreage 88,700

<u>Survey Record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	285	159	199	283.6
New attacks per strip acre	.065	.063	.038	.183
<u>Attacked trees on unit:</u>				
Lodgepole pine	5752	5594	2413	14,680
Whitebark pine			962	1,573
Totals	5752	5594	3375	16,253

This area supports a rapidly increasing infestation along the Gallatin-Madison Divide, the probably source of which is the heavy outbreak in the Tobacco Root Mountains, 11 to 25 miles to the west and northwest. The outbreak seems to be confined almost entirely to the extreme western portion of the unit.

West Gallatin River  
Acreage 104,200

<u>Survey Record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	355	723	731	760
New attacks per strip acre	.023	.038	.032	.034
<u>Attacked trees on unit:</u>				
Lodgepole pine	1762	2633	2574	2995
Whitebark pine	588	1317	760	540
Totals	2350	3950	3334	3543

The small area west of Big Springs where the infestation seemed to be gaining a foothold in overmature lodgepole pine showed fewer attacked trees in the portion examined than it did in 1933. The increase over the unit as a whole is too small to cause any concern at present.

Porcupine Creek  
Acreage 66,250

<u>Survey Record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	527	408	456	382
New attacks per strip acre	.021	.035	.026	.026
<u>Attacked trees on unit:</u>				
Lodgepole pine	1383	1983	615	698
Whitebark pine	--	361	1076	1038
Totals	1383	2344	1691	1736

Practically no change is indicated in the infestation on this unit for 1934.

Big Horn Peak

This unit was not included in the Gallatin Survey for 1934 as it has been made a part of the Yellowstone Park and was included in that survey.

Taylor Fork  
Acreage 118,500

<u>Survey record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	506	694	830	392
New attacks per strip acre	.063	.081	.049	.076

Attacked trees on unit:

Lodgepole pine	1639	1127	2708	5446
Whitebark pine	<u>5852</u>	<u>5445</u>	<u>3161</u>	<u>3630</u>
Totals	7491	9572	5869	9076

The number of attacked trees increased more than 50 per cent in 1934 over the preceding year but the major concentration of attacks is believed to be on the Monument and Lodgepole Creek drainages in whitebark pine.

Miner Creek  
Acreage 71,700

<u>Survey record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	551	460	601	349
New attacks per strip acre	.020	.175	.104	.516

Attacked trees on unit:

Lodgepole pine	1172	1,842	1326	2,875
Whitebark pine	<u>257</u>	<u>10,718</u>	<u>6144</u>	<u>34,125</u>
Totals	1429	12,560	7470	37,000

A rapid gain in the whitebark pine infestation is being made not only on this unit but in the adjoining stands in Yellowstone Park. The infestation on the Miner Creek Unit is heaviest along the park boundary but has also reached an epidemic status along the Gallatin-Yellowstone River divide and the divides between Miner, Rock and Big Creeks. The number of infested lodgepole pine more than doubled in 1934 over the previous year's figure but the infestation in that timber type is still too light to constitute a serious menace.

Big Creek  
Acreage 60,800

<u>Survey record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	298	137	155	396
New attacks per strip acre	.033	.032	.078	.098
<u>Attacked trees on unit:</u>				
Lodgepole pine	1022	1933	1982	1995
Whitebark pine	1022	--	2773	3990
Totals	2044	1933	4755	5985

Only the whitebark pine showed an appreciable increase in number of attacked trees in 1934. Most of these trees are to be found along the Yellowstone-Gallatin divide and the high ridges. The infestation is actually much heavier than the data indicate, because the large proportion of untimbered area tends to deflate the infested-trees-per-acre figure. The available data indicate that the infestation in whitebark pine stands is only about 25 per cent less on this unit than in the same type on the Miner Creek unit.

Mystic Lake  
Acreage 89,900

<u>Survey record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	W-	243	234	119
New attacks per strip acre	e-	.013	.022	--
<u>Attacked trees on unit:</u>	Data			
Lodgepole & whitebark pine		1195	1933	--

Data for this unit are inadequate. No infested trees were found in the small amount of strip run, but it is quite certain that a few infested trees could be found in the lodgepole pine stands around Trail Creek Ranger Station where heavy wood cutting is in progress.

Cabin Creek  
Acreage 86,800

<u>Survey record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	698	534	502	275
New attacks per strip acre	.105	.081	.110	.103
<u>Attacked trees on unit:</u>				
Lodgepole Pine	2577	3181	2995	3465
Whitebark pine	6828	3685	6528	5475
Totals	9405	7066	9523	8940

The infestation on this unit is heavier than the data indicate owing to the large amount of untimbered acreage. The upper portions of the main streams and high ridges between Teepee, Red Canyon, Cabin and Beaver Creeks all support considerable infestation in both the lodgepole and whitebark pine types with the latter much more heavily infested.

West Yellowstone  
Acreage 79,850

<u>Survey record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	769	670	780	445
New attacks per strip acre	.046	.044	.015	.056
<u>Attacked trees on unit:</u>				
Lodgepole pine	1038	386	1170	4472
Whitebark pine	2596	3090	--	--
Totals	3634	3476	1170	4472

Although considerable increase was noted in the number of attacked trees on this unit, the infestation is still too light to be a menace to the timber stands.

West Fork of Madison River  
Acreage 127,200

<u>Survey record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	148	142	329	311
New attacks per strip acre	.043	.023	.127	.058
<u>Attacked trees on unit:</u>				
Lodgepole pine	1746	2904	1,972	7378
Whitebark pine	3742	--	14,208	--
Totals	5488	2904	16,180	7378

The data secured on this area indicate that the infestation is still light and confined to lodgepole pine. It is believed, however, that more data from the western part of this strip would show more infestation with at least half of it in the whitebark pine.

Horse Creek  
Acreage 48,150

<u>Survey record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	N	N	279	285.5
New attacks per strip acre	0	0	--	.193
<u>Attacked trees on unit:</u>				
Lodgepole pine	t	t	--	9293
Whitebark Pine	a	a	--	--

The sudden appearance of an infestation on this unit with none recorded the preceding year as the data indicate, is not actually what has happened. Some infestation was presented in the western part of the unit in 1933 but conditions did not permit a survey of it. In 1934, the insects apparently migrated from this portion and from the more heavily infested units to the north and west into the extensive lodgepole stands of this unit. Although the data do not show it, there is doubtless infestation in the whitebark pine stands on the western part of this unit.

Indian-Wolf Creek  
Acreage 91,600

<u>Survey record</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>
Acres of strip	60	267	212	315
New attacks per strip acre	.043	.081	.100	.108

<u>Attacked trees on unit:</u>				
Lodgepole pine	1258	1117	1307	4354
Whitebark pine	2697	6110	7841	5519
Total	3955	7447	9148	9893

The timber stands on this unit are limited in extent and are usually confined to the headwaters of streams.

A concentration of insect work reported on the ridge between the North and middle Forks of Bear Creek should be examined annually to note any unusual increase.

Jack Creek  
Acreage 75,500

<u>Survey record</u>		<u>1934</u>
Acres of strip	No	379
New attacks per strip acre	data	.554
<u>Attacked trees on unit:</u>	prior	
<u>Lodgepole pine</u>	to	40,380
Whitebark pine	1934	1,845
Total		42,225

The infestation has secured a good foothold in the mature lodgepole pine on the Jack Creek cutting areas and in the whitebark pine on the high ridges and divides. Lodgepole pine, however, carries much the heavier infestation.

Crockett Lake  
Acreage 124,160

<u>Survey record</u>		1934
Acres of strip	No	342
New attacks per strip acre	data	.646
<u>Attacked trees on unit:</u>		
Lodgepole pine	prior to	73,250
Whitebark pine	1934	6,530
Total		80,080

This area was found to have an outbreak which has become well established during the past two or three years. Lodgepole pine is the timber species most heavily invaded.

Timber on this unit occurs chiefly at the higher elevations and on north slopes. Consequently, a bird's-eye view of the area shows an alternation of timbered north slopes and grass covered south slopes running chiefly east and west over the entire unit except on some of the highest areas and in a few basins which have almost unbroken timber stands. In consequence, less than half the total area of the unit is timbered, with the rest an important grazing section.

Ruby River  
Acreage 121,920

<u>Survey record</u>		1934
Acres of strip	No	358
New attacks per strip acre	data	.787
<u>Attacked trees on unit:</u>		
Lodgepole pine	prior to	62,675
Whitebark pine	1934	33,300
Total		95,975

This unit adjoining the Crockett Lake Unit on the south has much the same type of timber stand but a somewhat heavier concentration of insect attack. The proportion of timbered area, however, is even less than on the Crockett Lake unit. Whitebark pine comprises a much larger proportion of the attacked trees than on the Crockett Lake unit.

Potosi  
Acreage 60,480

<u>Survey record</u>		<u>1934</u>
<u>Acres of strip</u>	No	263
New attacks per strip acre	data	.955
<u>Attacked trees on unit:</u>		
Lodgepole pine	prior to	53,750
Whitebark pine	1934	<u>3,900</u>
Total		57,650

This unit, which is now the Gallatin Forest portion of the Tobacco Root Mountain Range, has an apparently rapidly increasing infestation.

Mill Creek  
Acreage 60,480

<u>Survey Record</u>		<u>1934</u>
<u>Acres of strip</u>	No	315
New attacks per strip acre	data	4.068
<u>Attacked trees on unit:</u>		
Lodgepole pine	prior to	66,140
Whitebark pine	1934	<u>179,750</u>
Total		245,890

Of all units considered in this report the Mill Creek area shows both the heaviest infestation and evidence of the epidemic

having been established for the greatest length of time. Losses have been, and continue to be, severe and indications are that they cannot increase materially in the next few years due to the heavy depletion of the stand which has already occurred and the consequent limited supply of remaining host material. This unit is the Beaverhead Forest portion of the Tobacco Root Mountains.

Boulder  
Acreage 64,640

<u>Survey record</u>		<u>1934</u>
Acres of strip	No	303
New attacks per strip acre	data	1.067
<u>Attacked trees on unit:</u>		
Lodgepole pine	prior to	59,980
Whitebark pine	1934	<u>8,960</u>
Total		68,940

Not as large a proportion of the stand seems to have been killed up to the present time as on the neighboring Mill Creek area. Therefore, unless other factors intervene, we may expect an increase in the infestation during the next year or two before a decreasing supply of host material causes a reduction in the outbreak. This unit is the Deerledge Forest portion of the Tobacco Root Mountains.

To facilitate comparison, Table II is presented giving the average infestation per acre and the total for each unit for the period of the survey.

Table II  
STATUS OF THE MOUNTAIN PINE BEETLE INFESTATION ON THE GALLATIN FOREST  
1931 - 1934

Unit	: 1934 :		Number of Attacked Trees				Attacked Trees per Acre			
	: Acreage :	1931 :	: 1932 :	1933 :	1934 :	: 1931 :	1932 :	1933 :	: 1934 :	
South Cottonwood	: 71,100:	799 :	: 0 :	1,868 :	1,379 :	: .011 :	.000 :	.026 :	: .019	
Swan-Squaw Cr.	: 57,000:	1,899 :	: 3,580 :	1,864 :	10,136 :	: .033 :	.063 :	.032 :	: .178	
Gallatin Peak	: 88,700:	5,792 :	: 5,594 :	3,375 :	16,253 :	: .065 :	.063 :	.038 :	: .183	
W. Gallatin River	: 104,200:	2,350 :	: 3,950 :	3,334 :	3,543 :	: .022 :	.038 :	.032 :	: .034	
Porcupine Cr.	: 66,250:	1,383 :	: 2,344 :	1,691 :	1,736 :	: .021 :	.035 :	.026 :	: .026	
Big Horn Peak	: 26,500:	unsurveyed:	: 662 :	4,839 :	unsurveyed:	: unsurveyed:	.025 :	.182 :	: unsurveyed <sub>2</sub>	
Taylor Fork	: 118,500:	7,491 :	: 9,572 :	5,869 :	9,076 :	: .063 :	.081 :	.049 :	: .076	
Miner Creek	: 71,700:	1,429 :	: 12,560 :	7,470 :	37,000 :	: .020 :	.175 :	.104 :	: .516	
Big Creek	: 60,800:	2,044 :	: 1,933 :	4,755 :	5,985 :	: .033 :	.032 :	.078 :	: .098	
Nystic Lake	: 89,900:	unsurveyed:	: 1,195 :	1,933 :	0 :	: unsurveyed:	.026 :	.021 :	: .000	
Cabin Creek	: 86,800:	9,405 :	: 7,066 :	9,523 :	8,940 :	: .104 :	.081 :	.110 :	: .103	
West Yellowstone	: 79,850:	3,634 :	: 3,476 :	1,170 :	4,472 :	: .045 :	.043 :	.015 :	: .056	
West Fork Madison	: 127,200:	5,485 <sub>1</sub> :	: 2,904 :	16,180 :	7,378 :	: .045 <sub>1</sub> :	.023 :	.127 :	: .058	
Horse Creek	: 48,150:	unsurveyed:	: unsurveyed:	0 :	9,293 :	: unsurveyed:	unsurveyed:	.000 :	: .193	
Indian-Wolf Cr.	: 91,600:	3,955 <sub>1</sub> :	: 7,447 :	9,148 :	9,893 :	: .045 <sub>1</sub> :	.081 :	.100 :	: .108	
Crockett Lake	: 124,160:	unsurveyed:	: unsurveyed:	unsurveyed:	80,080 :	: unsurveyed:	unsurveyed:	unsurveyed:	: .645	
Ruby River	: 121,920:	" :	: " :	" :	95,975 :	: " :	" :	" :	: .787	
Jack Creek	: 75,500:	" :	: " :	" :	42,225 :	: " :	" :	" :	: .559	
Potosi	: 60,480:	" :	: " :	" :	57,650 :	: " :	" :	" :	: .954	
Mill Creek	: 60,480:	" :	: " :	" :	245,890 :	: " :	" :	" :	: 4.066	
Boulder River	: 64,640:	" :	: " :	" :	68,940 :	: " :	" :	" :	: 1.067	
Total	: 1,668,930:	45,629 :	: 62,285 :	73,019 :	715,844 :	: .045 :	.055 :	.062 :	: .429	

(1) Original data insufficient to be representative—used average for forest. (2) Included in survey of Yellowstone Park in 1934. (3) Acreage surveyed in 1931 - 1,023,700; in 1932 - 1,140,100; in 1933 - 1,188,250.

## GENERAL NOTES ON THE SURVEY

The estimates of the mountain pine beetle infestation on the units discussed in this report were obtained from 838.3 miles of strip one chain wide of which approximately 367 miles were run in lodgepole pine type, 86 miles in whitebark pine type and the remaining 406 miles in open country or timber type not susceptible to mountain pine beetle attack.

The units discussed in this report are on four different forests but rather than attempt to make separate reports for each forest, they have been included in the one report because of their close relationship.

Table III shows in condensed form, an analysis of the results and costs of the Gallatin survey for 1934.

Table III  
SUMMARY AND ANALYSIS OF RESULTS AND COSTS  
SURVEY OF MOUNTAIN PINE BEETLE INFESTATION ON GALLATIN NATIONAL FOREST  
1934

Items	Total	<u>Man-days on Project</u>	
		<u>Effective</u>	<u>Ineffective</u>
Man-days on survey	149	79	70
Miles of sample strip	858.3		
Miles of strip per man-day	5.76	10.87	
Acres covered by survey	1,669,530		
Acres covered per man-day	11,205	21,133	
Mileage covered by car	2,311		

<u>Total Cost of Survey</u>	
Labor	\$ 773.64
Transportation	40.10
Subsistence	248.61
Telephone & telegraph	1.95
Total	<u>\$1,064.30</u>

<u>Cost of Survey Distributed</u>	
Cost per man-day	\$ 7.143
Cost per mile of strip	1.24
Cost per sample acre	.155
Cost per acre of region surveyed	.00064
Percent of total area actually covered	.411

<u>Ineffective time as follows in man-days:</u>	
Travel	15
Sickness	None
Bad weather	55

The more important findings revealed by this survey are as follows:

(1) Over the forest as a whole the mountain pine beetle infestation in 1934 showed a decided increase over that of the previous year. Most of this gain was in the lodgepole pine type, the white-bark pine showing lower percent of increase than in 1933.

(2) Areas examined on the Madison and Ruby River drainages for the first time in 1934, were found to carry a heavy infestation. Of these the units in the Tobacco Root Mountains have suffered the most serious losses and support the heaviest infestation.

(3) The outbreak in whitebark pine on the Miner Creek Unit, which adjoins the north boundary of the Yellowstone Park showed a decided increase in 1934, and together with the outbreak in the Park constitute a serious menace to the timber stands of that region.